LETTERS TO THE EDITOR.

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The Weather of 1911.

WITH reference to Sir Edward Fry's letter in NATURE of November 16, the following figures may be of interest.

We have some eighteen records of the temperature up to a height of 15 kilometres or more over the British Isles during the period of the hot weather, distributed over seven days. Excluding the records for Scotland in September, where the weather was not hot, the following departures from the mean are found:—

At 2·5 kilometres a temperature of +5·5° C.
5·0 ,, ,, ,, +2·5°
7·5 ,, ,, ,, normal
10·0 ,, ,, ,, normal
12·5 ,, ,, ,, −7·0°
15·0 ,, ,, ,, −5·0°

These figures show that the heat was confined to the lower strata. With anticyclonic weather, such as prevailed during the summer, it is usual to find a negative departure from the mean temperature above 12 km.; but the greatest departure from the mean is generally found at about 7·5 km., where, as a rule, we get +5° C. The +5° C. at 2·5 and the normal value at 7·5 are very unusual, but they are shown more or less in every record.

I agree with Dr. Shaw in thinking that the surface conditions are imposed upon us by the conditions that prevail above. From the total and partial correlation coefficients that I have obtained it seems to me that the pressure in the layers of air just under the isothermal, which may be taken as the pressure at 9 km., is the dominant factor in the distribution of pressure and temperature in the whole region of the atmosphere that has been explored, with the exception of the temperature near the ground, which in temperate latitudes is certainly more dependent upon the direction of the wind than upon anything else.

I do not altogether agree with Dr. Shaw in thinking that the changes of temperature at 9 km. are in any way due to changes in the direction of the wind at that height. It seems to me more likely that they are produced by rising or falling air, and that the vertical motion, and therefore the temperature, is the direct result of the variations of pressure.

Unfortunately, it is only on rare occasions that we can ascertain the rate and direction of the wind at great heights; but there is sufficient information to show us whether the temperature at any given height up to 15 or 20 km. is dependent upon the direction and rate of drift of the atmosphere as a whole, for the direction and distance of the falling place of the balloon supply the requisite information about the general drift on any particular occasion.

I hope shortly to tabulate the results of some 200 ascents, and ascertain what the connection, if any, may be.

Pyrton Hill, December 2. W. H. DINES.

The Interaction between Passing Ships.

THE statement made in NATURE of November 30, in the article on "The Interaction between Passing Ships," to the effect that no experiments have been made to test this interference in shallow water except those recently carried out at Teddington, needs some little qualification. A somewhat extensive set of experiments to test this, among other points, was carried out some two months ago at University College, Dundee. Screw-propelled models of various sizes, at distances apart up to 200 yards, were used in these experiments, the depth of water varying from 1·6 times the draught of the vessels to 12 times the draught. The results were of such apparent interest that they were communicated to the Admiralty, who arranged for the Teddington tests, of a more restricted nature, to be carried out on larger accurate scale models of the *Hawke* and *Olympic*. The results of the Dundee experiments have been for some weeks in the hands of one of the scientific societies, and it is hoped that they may soon be made public. A. H. GIBSON.

Engineering Department, University College,
Dundee, December 2.

December Meteor-showers.

THE following meteor-showers become due during the period December 8–31:—

Epoch December 7, 17h. (G.M.T.), second order of magnitude. Principal maximum, December 8, 8h. 15m.; secondary maximum, December 8, 3h. 40m.

Epoch December 7, 22h. 30m., approximately sixth order of magnitude. Principal maximum, December 8, 1h. 30m.; secondary maximum, December 9, 1h. 40m.

Epoch December 13, 17h. 30m., approximately sixth order of magnitude. Principal maximum, December 12, 1h.; secondary maxima, December 11, 15h. 30m., and December 13, 11h.

Epoch December 13, 13h. 30m., thirteenth order of magnitude. Principal maximum, December 14, 22h. 5m.; secondary maxima, December 13, 21h. 5m., and December 16, 17h. 30m.

Epoch December 18, 2h. 30m., thirty-fifth order of magnitude. Principal maximum, December 18, 19h. 50m.; secondary maximum, December 19, 7h. 40m.

Epoch December 19, 10h., approximately fifteenth order of magnitude. Principal maximum, December 19, 13h. 50m.; secondary maximum, December 19, 17h. 15m.

Epoch December 22, 1h., fourth order of magnitude. Principal maximum, December 23, 0h. 40m.; secondary maximum, December 22, 21h. 30m.

Epoch December 23, 2h. 30m., ninth order of magnitude. Principal maximum, December 24, 6h. 30m.; secondary maximum, December 24, 18h. 15m.

Epoch December 25, 15h. 30m., approximately twentieth order of magnitude. Principal maximum, December 27, 13h. 50m.; secondary maximum, December 26, 15h.

Epoch December 30, 0h. 30m., approximately eighteenth order of magnitude. Principal maximum, December 31, 15h.; secondary maxima, December 31, 11h. 30m. and 16h. 15m.

There are reasons for believing that the total mass of a meteoric maximum may be considerably greater than is generally supposed. Such a mass of matter, in being brought to rest, must give rise to currents in the upper strata of the atmosphere, these currents very probably constituting what may be known as atmospheric depressions, inasmuch as a column of air if thus set in motion will weigh less than when undisturbed.

In December meteor-showers are more evenly distributed over the month than was the case in November; still, there are periods of special meteoric activity. The first of these, in intensity as well as in time, occurs on December 8; the second period, as regards intensity, is spread over the days December 22–24; while the third period, which is comparatively weak, falls between December 16 and 21. Shooting stars may be numerous on the night of December 31. JOHN R. HENRY.

Dublin, December 4.

The Inheritance of Mental Characters.

To Dr. Archdall Reid it is an "astounding thing" that I should imagine that Prof. Pearson could possibly agree with the interpretation I ventured to put upon his statement which Dr. Reid condemns as "void of all content" and "quite nonsensical." Dr. Reid evidently feels that my quotation from his attack upon Prof. Pearson was not quite fair, in that I omitted part of the context which he regards as essential. I apologise for an entirely unintentional and unforeseen cause of offence. As he has himself rectified this omission, I may, I presume, take it that all is *en évidence*

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requisite to substantiate his wholesale and unqualified condemnation. May I follow Dr. Reid's example, and quote the whole of his quotation from Prof. Pearson?—"The sameness [in the appearance of moral and intellectual faculties as well as of physical characters][1] surely involves something additional. It involves a like heritage from parents. The degree of resemblance between children and parents for the physical characters in man may be applied to the degree of resemblance between children and parents for psychical characters. We inherit our parents' tempers, our parents' consciousness, shyness and ability, even as we inherit their stature, forearm, and span." This is the whole of the statement condemned.

I gather that Dr. Reid thinks as I do, that individuals vary in their capacity for developing various mental characters such as temper, skill in mathematics, music, and the various uses of language, and that such capacities may be, and very frequently are, inherited. Physical characters, different from "eye-colour or hair texture," but such as the capacity for a high or low degree of development of the muscles, bones, or internal organs, and including "stature, fore-arm, and span" to a considerable extent, also vary, and are very frequently inherited. Such characters, mental or physical, depend upon both inborn capacity and environment for development. Both capacity for development and environment vary, but only the capacity for development is inherited. Therefore I see nothing in Prof. Pearson's statement which in any way warrants Dr. Reid in saying that it is "utterly without significance, utterly void of all content," and "is so vague as to be quite nonsensical."

It is quite evident that Dr. Reid believes that Prof. Pearson holds that something beyond a capacity for development, which varies in individuals, is inherited. But there is nothing in the statement which implies anything of the kind, so it appears that Dr. Reid has issued an unqualified condemnation of something, with which he does not disagree, that Prof. Pearson has said, because he does not agree with what he believes Prof. Pearson thinks but has not said

Now I know that there are people who claim the peculiar power of knowing what others think without using any of the usual physical means of communication. I, unfortunately, have no such power, and I take it that there are many who, like myself, are in a less fortunate position than the members of Dr. Reid's audience, in whose minds, he tells us, no misapprehension as to his meaning arose. The unfortunate persons who have no means, beyond reading what has been written, of knowing what Prof. Pearson and Dr. Reid think, are liable to be seriously misled by what Dr. Reid wrote in his paper. In his anxiety to emphasise the great capacity possessed by man for making acquirements, Dr. Reid runs perilously near to ignoring the facts that this general capacity is made up of many capacities, that all these capacities are variable, and that the variations are heritable. Is he so annoyed with Prof. Pearson for laying what he considers undue stress upon the heritable part of mental characters, that his criticism has gone beyond what he actually means? This is suggested by the manner in which he treats some of the physical characters in his paper. "Heads, hearts, lungs, livers, and the like are inborn and invariably present in parents and offspring." Certainly, but the capacity for development varies in different individuals and is heritable. For instance, the heart of one individual will react to frequently repeated and violent exercise by increased muscular development, while in another it will give way and dilate under precisely similar conditions. So also with mental characters. No environment will make some men mathematicians, while others will become great mathematicians in a comparatively unfavourable environment. Much the same may be said of temper and similar characters.

After all, it is surely the heritable part—the variations in capacities for making acquirements in various directions—that really matters from the eugenic point of view.

Dr. Reid fears that "Prof. Pearson will pray ardently to be delivered from his friends." Unfortunately I have not the slightest claim to the friendship of Prof. Pearson. I neither fear nor hope with regard to his feelings as to what I have written about his statement. Even should he publish a repudiation of my interpretation in every detail, my position would be precisely what it is now—one of protest against a wholesale, unqualified, and one might almost say violent condemnation without any very evident reason, a condemnation likely to cause misunderstandings in a subject in which I am particularly interested. Such methods in controversy can serve no useful purpose.

Glasgow, December 2. CHARLES WALKER.

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[1] Inserted to make the meaning of the context clear.

On the Occurrence of Brown Cannel Coal ("Kerosene Shale") with *Reinschia australis* in the Falkland Islands.

AMONGST an interesting exchange series of fossils sent to the National Museum, Melbourne, by the honorary curator of the Falkland Islands Museum, there is a specimen of "kerosene shale," which, on account of its deep brown colour, resinous lustre, and eminent conchoidal fracture, at once reminded me of the oil-bearing rock of Hartley, New South Wales. Upon slicing this specimen and comparing the structure with a slide of the Hartley rock in our museum cabinet it was evident that they were practically identical. The Falkland Islands specimen is formed, like that of the New South Wales rock, almost entirely of the small (?) thallophyte described by MM. Renault and Bertrand under the name of *Reinschia australis*, and believed by them to be nearly related to the Hydrodictyaceæ or Volvocineæ. The deep yellow coloured sacs are of the same dimensions in both examples. The specific gravities of the Falkland Islands and the New South Wales rocks were found to be approximately equal, being in both cases slightly more than 1. Prof. Liversidge gives that of the Hartley, New South Wales, specimen as 1·052. As Liversidge points out, this rock is scarcely a shale, since the shaly structure in hand-specimens is absent, but would be more aptly termed a "Cannel coal," or, as suggested by the Rev. W. B. Clarke, "brown cannel."

The Falkland Islands specimen was found near Hill Cove, West Falkland, and I have since been kindly furnished with further information as to its occurring a fair distance up several river valleys; so that this fact, together with its tolerably fresh appearance and only slightly water-worn surface, does not support the idea that it may be drifted from a great distance. There is considerable probability that deposits of this "kerosene shale" will eventually be found *in situ*, since the fact of a typical Glossopteris flora occurring in East Falkland has already been proved by J. Halle, the geologist to the Swedish Magellanic Expedition (*Geol. Mag.*, 1908, p. 265). To quote that author's own words:—"Fossils, principally leaves of Glossopteris, occur in many places, and it is evident that the whole southern part of East Falkland south of Wickham Heights belongs to the Gondwana system." Not only does the fossil flora correspond in this remarkable way with other areas of Gondwanaland, but amongst the brachiopods in the above collection several of the Spirifers bear a close resemblance to New South Wales species. FREDERICK CHAPMAN.

National Museum, Melbourne.

Optical Projection of Figures in Full Relief.

AT the recent Glasgow Exhibition an optical illusion was exhibited which showed very distinctly and daintily living human figures in full relief, standing upon a desk, on a scale of about 8 inches = 6 feet.

The production has caused much debate in private circles, and I write in the hope that someone may be able to inform me how it was produced.

I may say that the images were shown in ordinary electric light, and no optical apparatus of any description was visible.

Behind the figures the wall, which was at a distance of about 8 inches, was covered by what seemed an ordinary flowered tapestry.

The writer saw the same thing about seven years ago on the stage in Paris, and then, as now, the explanation eluded him and many of his friends. CURIOUS.

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